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KEYBOARD SUPPORT

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(56) Prior Art Documents  
AU 21786/88  
AU 19015/88  
AU 75700/87

(57) Claim

1. A keyboard support apparatus of the kind having a mounting bracket, a support member, a first and second linkage bar each pivotally connected to the mounting bracket and to the support member whereby the support member is adapted for movement between a raised or lowered position relative to the mounting bracket, and locking means for immobilizing the apparatus against said movement; the locking means comprising a plate mounted to the support member on the side of the first linkage bar opposite the support member by means permitting the plate to move laterally towards or away from the support member, a formation of the first bar being interengageable with a formation of the plate, and biasing means urging the plate towards the support member.

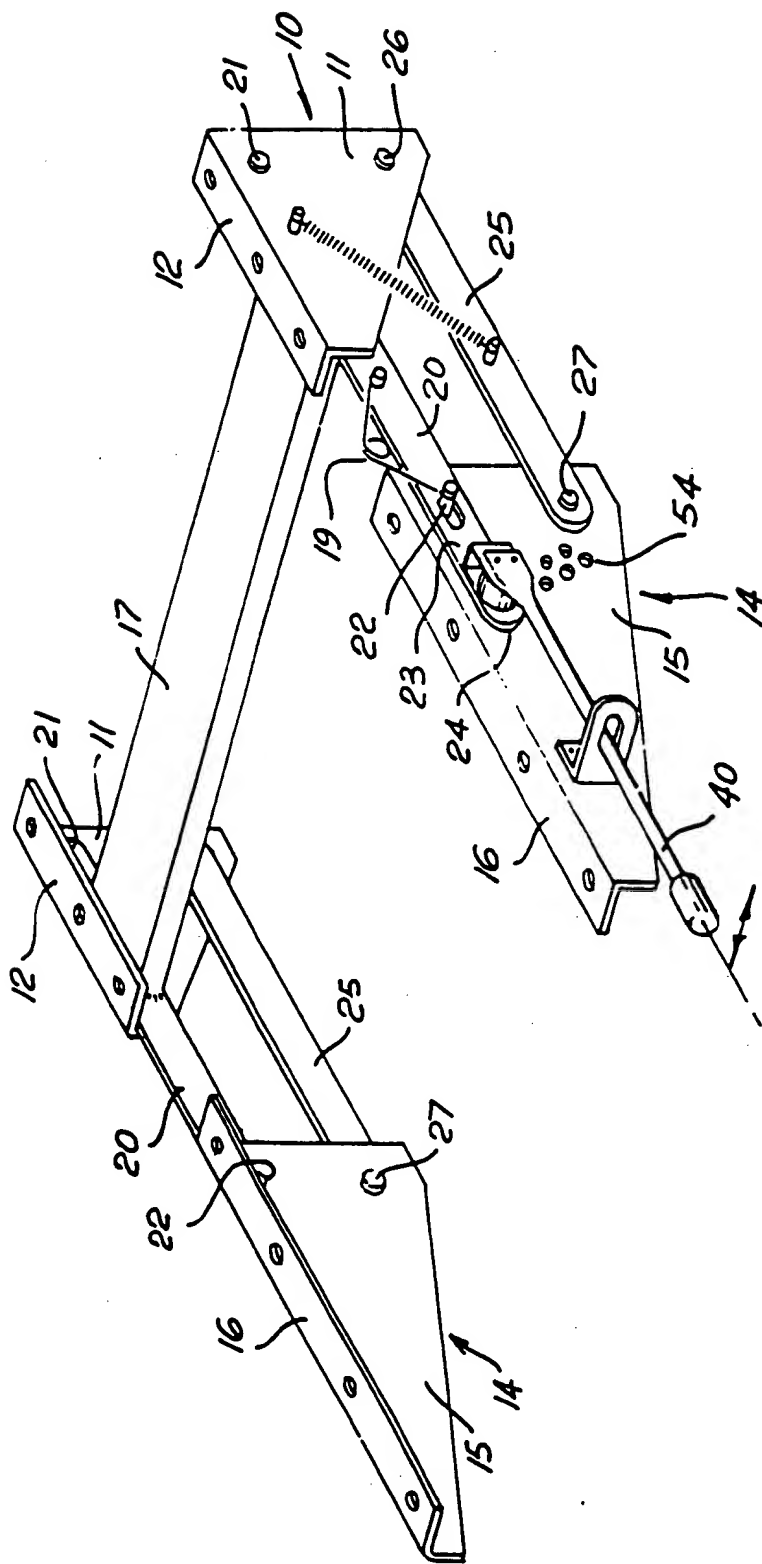


FIG. 9



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1. A keyboard support apparatus of the kind having a mounting bracket, a support member, a first and second linkage bar each pivotally connected to the mounting bracket and to the support member whereby the support member is adapted for movement between a raised or lowered position relative to the mounting bracket, and locking means for immobilizing the apparatus against said movement; the locking means comprising a plate mounted to the support member on the side of the first linkage bar opposite the support member by means permitting the plate to move laterally towards or away from the support member, a formation of the first bar being interengageable with a formation of the plate, and biasing means urging the plate towards the support member.

13. A keyboard support apparatus of the kind having a mounting member, a support member, a first and a second linkage bar, the first bar including at a first end an aperture for engaging a first pivot pin extending from one of said members and at a second end a slot for engaging a second pivot pin extending from the other of said members for allowing relative displacement between said pivot pins, whereby the support member is adapted for movement between a raised and lowered position relative to the mounting member, and locking means for immobilising the apparatus against said movement, the locking means comprising a first formation associated with said first bar or an extension thereof which is adapted for movement into locking interengagement with a second formation associated with one of said members following relative displacement between said pivot pins.



This invention relates to an apparatus suitable, but not exclusively, for use in supporting a processor, typewriter or an electronic keyboard.

In offices, instruments such as electronic  
5 keyboards are commonly accessed from desks. However to minimize operator fatigue and encourage proper posture it is desirable to present the instrument to the operator at a suitably elevated position which is ergonomically efficient.

10 Controls for adjustment of keyboard support elevation should be accessible and convenient for the operator. Desirably adjustment of support elevation could be accomplished with one hand and without risk of damage to long fingernails. The support and elevation  
15 adjustment mechanism should be robust and capable of withstanding overload such as a person sitting or leaning on the support. Quick, positive, secure and convenient locking of the support at the desired height would be advantageous.

20 It would further be desirable to simplify the manufacture and construction of keyboard support apparatus.

Patent 581,471 describes apparatus having a mounting bracket adapted to be secured to a desk, a  
25 keyboard support member, linkage bars pivotally mounted to the mounting bracket and to the support member whereby the support member is adapted for movement between a raised or lowered position relative to the mounting



bracket and locking means for immobilizing the apparatus against such movement. In described embodiments the locking means is a clamp assembly whereby the linkage bar is clamped to the support member by a threaded bolt  
5 extending through the bar and support member and cooperating with a threaded handle.

That apparatus relies upon the clamping force and friction between the parts for locking and if either is inadequate there is a risk of damage to equipment or  
10 injury to the user.

Application 19015/88 describes a similar apparatus in which locking is achieved by means of a pawl which engages a toothed extension of a linkage bar. However the locking mechanism is complex to manufacture and is  
15 engaged or disengaged by pulling a handle towards the operator, which is difficult and inconvenient for an operator seated in a "user" position.

Patent application 21786/88 describes a similar apparatus in which the locking mechanism involves  
20 engagement of a pin with an aperture of the mounting bracket. The pin may be driven by a bowden cable through a link bar into an aperture of the mounting bracket or may be a part of a lever having a fulcrum on the support member and adapted to engage an aperture of the mounting  
25 bracket.

Both forms of this arrangement suffer from a lack of positive engagement as well as difficulty in control. Tolerances required to facilitate locking engagement of

the pin and hole result in an unsteady mechanism. The latter form is very susceptible to unintentional disengagement by an operator knocking the lever.

An object of the present invention is to provide a  
5 keyboard support apparatus which avoids at least some of the disadvantages of prior art and/or which meets the desiderata discussed above by more efficient means than prior art.

According to one aspect the invention consists in a  
10 keyboard support apparatus of the kind having a mounting bracket, a support member, a first and second linkage bar each pivotally connected to the mounting bracket and to the support member whereby the support member is adapted for movement between a raised or lowered position  
15 relative to the mounting bracket, and locking means for immobilizing the apparatus against said movement, the locking means comprising a plate mounted to the support member on the side of the first linkage bar opposite the support member by means permitting the plate to move  
20 laterally towards or away from the support member, a formation of the first bar being interengageable with a formation of the plate, and biasing means urging the plate towards the support member.

According to another aspect of the invention there  
25 is provided a keyboard support apparatus of the kind having a mounting member, a support member, at least one linkage bar including at a first end an aperture for engaging a first pivot pin extending from one of said members and at a second end a slot for engaging a second



pivot pin extending from the other of said members for allowing relative displacement between said pivot pins, whereby the support member is adapted for movement between a raised and lowered position relative to the mounting member, and locking means for immobilising the apparatus against said movement, the locking means comprising a first formation associated with said first bar or an extension thereof which is adapted for movement into locking interengagement with a second formation associated with one of said members following relative displacement between said pivot pins.

Embodiments of the invention will now be described by way of example only with reference to the accompanying drawing wherein:

Fig. 1 shows schematically a keyboard support apparatus viewed in side elevation in a raised position,

Fig. 2 shows schematically the keyboard support apparatus of Fig. 1 in a lowered position,

Fig. 3 shows schematically the keyboard support apparatus of Fig. 1 viewed from the front.

Fig. 4 shows the apparatus of Fig. 1 in plan viewed from beneath,

Fig. 5 shows in side view a portion of the apparatus of Figs. 1 and 2 equipped with locking means in accordance with the invention,

Fig. 6 shows plate 30 of Fig. 5 in detail,

Fig. 7 shows a section on line A-A of Fig. 5,

Fig. 8 shows a section on line B-B of Fig. 5,

Fig. 9 shows in schematic perspective a second embodiment of the invention,

Fig. 10 shows in more detail a part of Fig. 9.

With reference to figures 1 to 4 there is shown  
5 schematically a keyboard support apparatus of the kind under discussion.

A mounting bracket 10 comprises a vertical plate 11 and horizontal flange 12 whereby the mounting bracket may be mounted by fasteners to, for example, the underside of  
10 a desk top 13. A support member 14 comprises a vertical plate 15 and a horizontal flange 16 which in use has a keyboard or keyboard supporting platform (not shown) fastened thereto.

A first linkage bar 20 is pivotally connected by  
15 means of pivot pin 21 to bracket vertical plate 11 and is pivotally connected by means of pivot pin 22 to vertical plate 15 of support member 14. First linkage bar 20 has an extension 23 beyond pivot pin 22 to an extremity 24.

A second linkage bar 25 is pivotally connected by  
20 means of pivot pin 26 to mounting bracket plate 11 and is pivotally connected by means of pivot pin 27 to plate 15 of support member 14. The pivot pins may be rivets or other suitable fasteners and are parallel.

Bars 20 and 25 are parallel and the distance  
25 between pivot pins 21,22 corresponds to that between pivot pins 26,27 so that the mounting bracket, support member, first and second bars together constitute a four bar linkage or pantagraph.

The arrangement permits the support member to be swung upwardly or downwardly with respect to the work surface while maintaining a constant inclination of the support member upper surface relative to the plane of the work surface.

In practice as shown in figs. 3 and 4 the parts of the apparatus of Fig. 1 are connected by a box beam 17 to a second corresponding assembly as shown in figs. 3 and 4, corresponding parts being identified by corresponding numerals.

In the past, when the support member was at a required altitude, a bar 25 and the support member 14 were clamped together e.g. by a threaded bolt and cooperating threaded or handle or star wheel, for example by means of a bolt acting as pivot pin 27.

In practice also, there is commonly provided a spring (not illustrated) for assisting raising of the support member relative the mounting bracket.

According to a first preferred embodiment of the present invention there is provided instead, or in addition, a plate 30 (Figs. 5 to 8) made of spring steel and mounted to vertical plate 15 of support member 14 by means of pivot pin rivets 22, 27.

Rivet heads 31, 32 of pivot pins 22, 27 are most clearly seen in fig. 7. Plate 30 is mounted on the side of bar 20 opposite to support member 14 so that the extension 23 of bar 20 is sandwiched with clearance between plate 30 and plate 15.

Plate 30 is shown in fig. 6 and has mounting apertures 34 and 35 and has a plurality of pin engaging apertures or slots 33 which are disposed on an arc, at a predetermined radius from aperture 34. Plate 30 is  
5 located by means of apertures 34, 35 on pivot pins 22, 27 respectively. Plate 30 has apertures 36 and 37 whereby the plate may be riveted to handle 40.

The outermost side of plate 30 is provided with a lever handle 40 secured to plate 30 by rivets 41, 42  
10 extending through handle 40 and apertures 36, 37.

Plate 30 is otherwise free.

Because plate 30 is of spring steel, handle 40 acts as a lever having a fulcrum at pin 22 but adapted for lateral movement at its free end sideways towards or away  
15 from the plane of plate 15 of support member 14.

Plate 30 is resiliently biased towards a plane parallel to plate 15 but is able to be deformed on line A-A to an angle therefrom. Extension 23 is provided with a pin 49 which extends laterally (parallel to the axis of  
20 pivot pin 22) towards plate 30 and is engageable with a selected one of apertures 33 of plate 30.

Pivot pins 22, 27 may be provided with washers 42 as desired.

In use if it is desired to move the support means  
25 from a first altitude to a second altitude, lever handle 40 is moved laterally to the side whereby plate 30 is resiliently deformed at the fulcrum line A-A extending through pivot pins 22, 27, plate 30 moving away from bar

20 and support member plate 15. As plate 30 moves away from bar 20, pin 49 is disengaged from apertures 33. The support member may then be raised or lowered as desired. Lever handle 40 may then be released to move plate 30 towards plate 15, allowing pin 49 to engage a selected other hole 33, pin 49 being held in engagement with hole 33 by spring plate 30 which resiliently returns to a position parallel to, and adjacent bar 20.

It will be understood that interengageable formations other than a pin and aperture may be employed. Also if desired two or more pins may engage two or more holes.

A second embodiment of the invention will now be described with reference to figures 9 and 10 wherein parts corresponding to those of Figs. 1-8 are identified by corresponding numerals. In this embodiment pivot pin 22 extends through a slot in bar 20 and a spring 19 acts between bar 20 and pin 22.

With reference to Figures 9 and 10 a collar 53 is stepped to a reduced diameter boss 55 adjacent bar 22 and is thread mounted to the bar. A lever handle 40 is riveted at 51 to a "U" shaped spring steel bracket 52 which is pivotally mounted to bar 22 by means of boss 55 which extends through an aperture of one arm 56 of bracket 52 and retains the arm between collar 53 and bar 22.

A pin 49 extends axially through collar 53 and boss 55. One pin end 58 is tapered and projects through bar

22 to engage in an aperture 54 or slot of plate 15. Pin  
49 is reduced in diameter adjacent its other end, the  
portion of reduced diameter 59 extending successively  
through an aperture in the other arm 57 of bracket 52  
5 through a slot 60 of lever handle 40, through an "O" ring  
61, and terminating at a threaded retaining nut 62.

Lever 40 is thus mounted for pivotal movement about  
the axis of pin 49 and is moveable laterally by resilient  
deformation of bracket 52 to withdraw pin 49 from  
10 engagement with an aperture of plate 15.

The support member is adjusted to a require  
altitude relative to the mounting bracket and pin 49 then  
is engaged with a selected corresponding hole 54, the pin  
being biased in engagement by pin 51. In another form of  
15 this embodiment (not illustrated) bracket 52 is rigid and  
a compression spring acts axially on pin 41 to urge it  
into engagement with a selected hole 54.

In preferred embodiments of the invention at least  
one of bars 20, 25 is, or is associated with, a hollow  
20 duct (not illustrated) the duct being adapted to conduct  
a keyboard cable from a keyboard supported upon support  
member 14.

The duct may for example be a square section hollow  
tube welded to bar 20, or bar 20 may itself be of hollow  
25 section. The duct should be of sufficiently large  
internal dimension to enable the plug or socket  
terminating a keyboard cable to be threaded through the  
duct. The duct should convey the cable to a location

near the leading edge of the rear brackets from where the cable may be connected to a computer, VDU, etc., as required.

5 The duct serves to keep the cabling tidy and prevents it from becoming jammed in the mechanism or inadvertently unplugged.

10 As will be apparent to those skilled in the art from the teaching hereof, the apparatus herein described is simple and relatively inexpensive to manufacture, provides positive engagement or disengagement on locking, is convenient for use by an operator in a seated or "user" position, and is unobtrusive in appearance.

The invention extends to include mechanical equivalents of the principle herein disclosed.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A keyboard support apparatus of the kind having a mounting bracket, a support member, a first and second linkage bar each pivotally connected to the mounting bracket and to the support member whereby the support  
5 member is adapted for movement between a raised or lowered position relative to the mounting bracket, and locking means for immobilizing the apparatus against said movement; the locking means comprising a plate mounted to the support member on the side of the first linkage bar  
10 opposite the support member by means permitting the plate to move laterally towards or away from the support member, a formation of the first bar being interengageable with a formation of the plate, and biasing means urging the plate towards the support member.
2. Apparatus according to claim 1 wherein a formation of the bar is selectively engageable with one of a plurality of formations of the plate.
3. Apparatus according to claim 1 or claim 2 wherein the formation of the bar is located intermediate the pivotal connection to the mounting bracket and the pivotal connection to the support member.
4. Apparatus according to claim 1 or claim 2 wherein the formation of the bar is located on an extension projecting beyond the pivotal connection to the mounting bracket.
5. Apparatus according to any one of the preceding claims wherein the plate is mounted to the support member



by means permitting hinged movement towards or away from the support member.

6. Apparatus according to any one of claims 1 to 4 wherein the plate is moved towards or away from the support member by resilient deformation.

7. Apparatus according to claim 6 wherein the plate is of spring steel.

8. Apparatus according to any one of the previous claims wherein the plate is provided with a lever facilitating movement towards or away from the support member.

9. Apparatus according to any one of the preceding claims wherein a plurality of formations of the bar engages a plurality of formations of the plate.

10. Apparatus according to any one of the preceding claims wherein the formations of the plate are elongate slots.

11. Apparatus according to any one of the preceding claims further including clamping means for clamping the plate in engagement with the bar.

12. Apparatus substantially as described with reference to Figs. 1-8.

13. A keyboard support apparatus of the kind having a mounting member, a support member, a first and a second linkage bar, the first bar including at a first end an aperture for engaging a first pivot pin extending from one of said members and at a second end a slot for engaging a second pivot pin extending from the other of

said members for allowing relative displacement between said pivot pins, whereby the support member is adapted for movement between a raised and lowered position

10 relative to the mounting member, and locking means for immobilising the apparatus against said movement, the locking means comprising a first formation associated with said first bar or an extension thereof which is adapted for movement into locking interengagement with a  
15 second formation associated with one of said members following relative displacement between said pivot pins.

14. Apparatus according to claim 13 wherein said locking means includes a lever adapted for lateral movement sidewardly towards or away from the support member and adapted to facilitate engagement and

5 disengagement of said first and second formations.

15. Apparatus according to claim 12 wherein the lever is mounted to the bar or an extension of the bar.

16. Apparatus according to claim 11 or 12 wherein the formation associated with the bar is a pin driven by said lever into engagement with a pin receiving aperture or socket of the support member.

17. Apparatus according to claim 13 wherein said second pivot pin is biased in said slot toward or away from the first pivot pin.

18. Apparatus substantially as herein described with reference to Figs. 9 and 10.

19. A keyboard support apparatus according to any one of the preceeding claims having a cable duct associated

with a linkage bar.

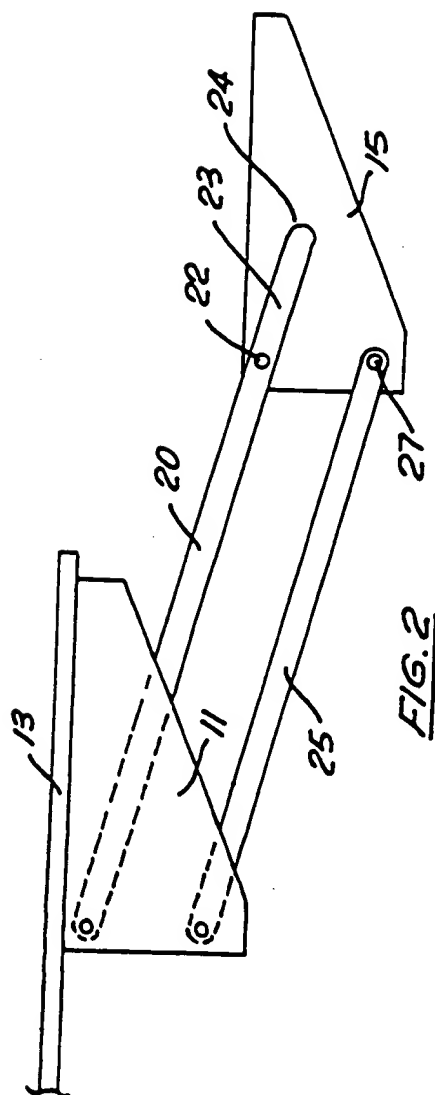
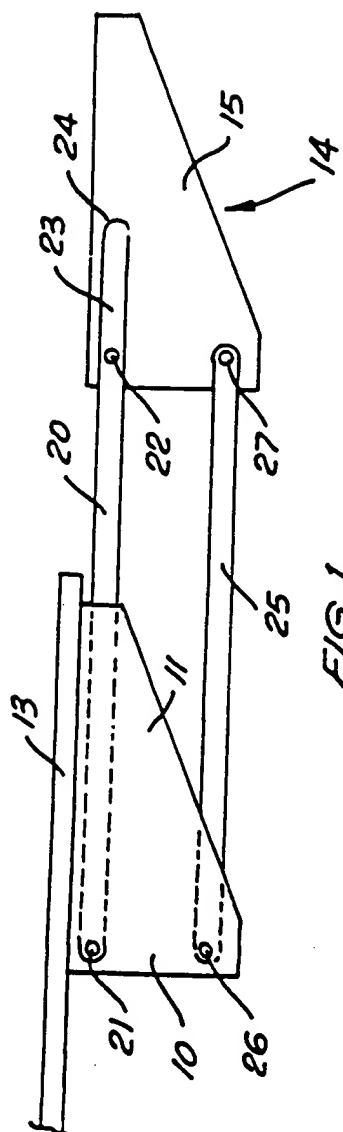
20. A keyboard support apparatus according to any one of claims 1 - 12 having a linkage bar which is a hollow cable duct.

DATED this 9th day of February 1993

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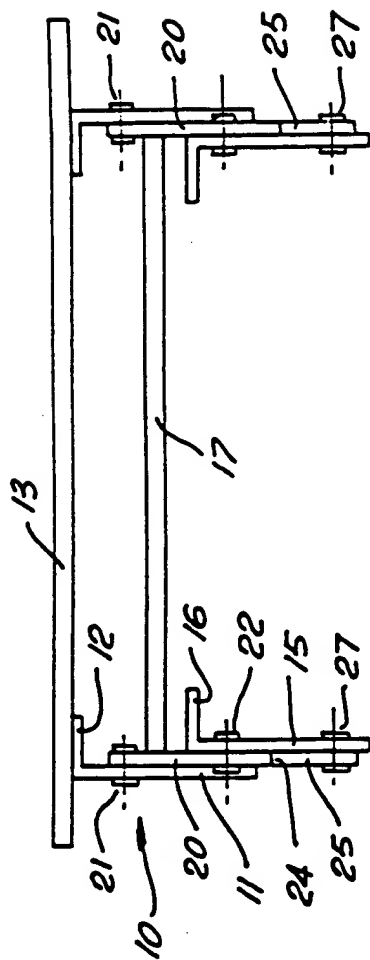


FIG. 3

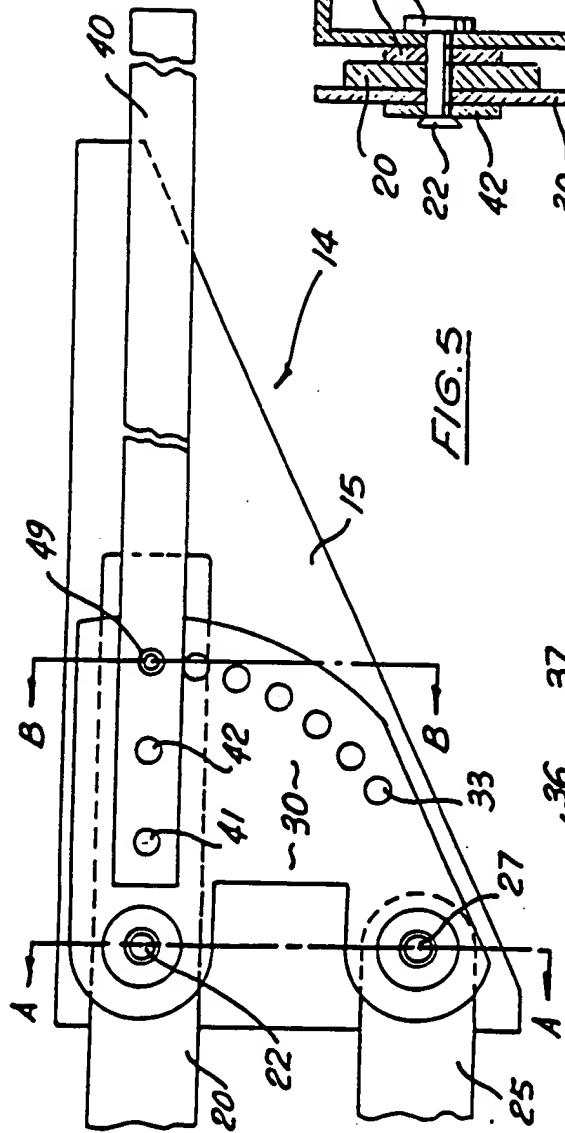


FIG. 5

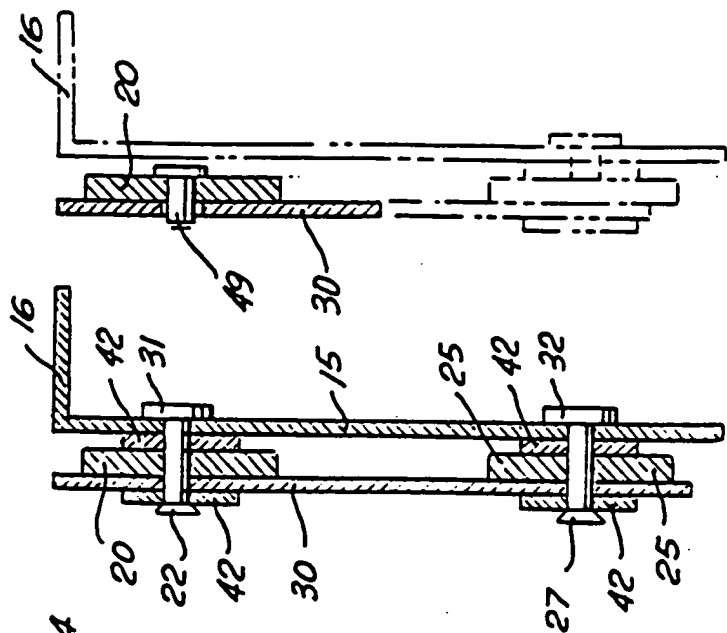


FIG. 6

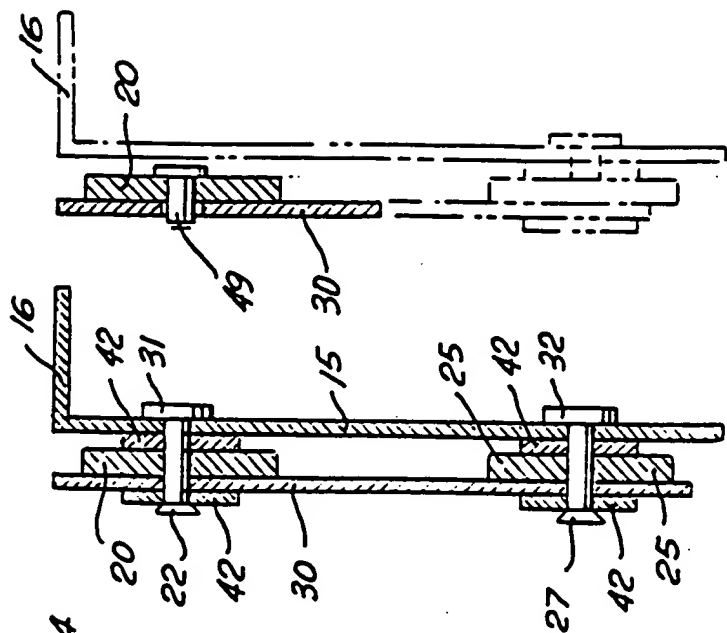


FIG. 7

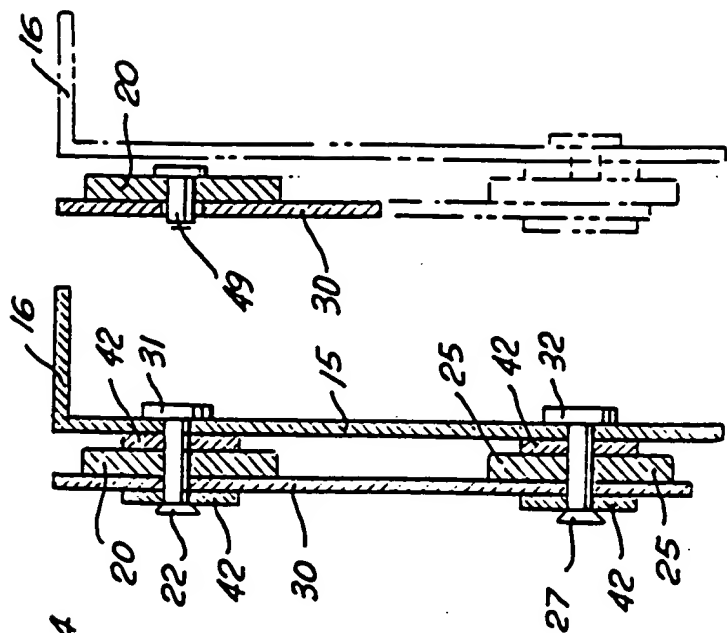


FIG. 8

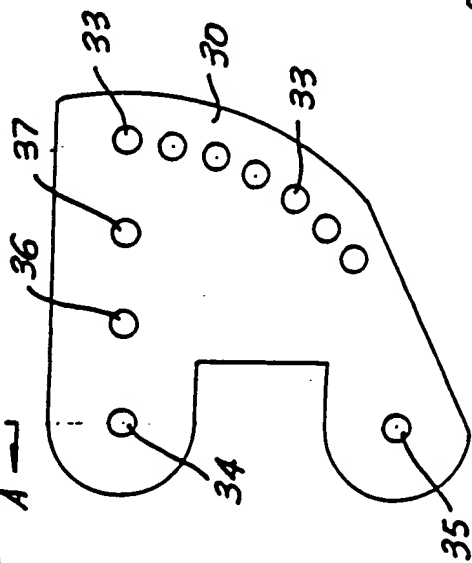


FIG. 9

